

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

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Laender Governments



European Technical Assessment

ETA-17/0912
of 6 September 2022

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General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

Sundolitt XPS 300,
Sundolitt XPS 500,
Sundolitt XPS 700

Product family
to which the construction product belongs

Extruded polystyrene foam boards as load bearing layer
and/or thermal insulation outside the waterproofing

Manufacturer

Sundolitt GmbH
Langer Kamp 1
38644 Goslar
DEUTSCHLAND

Manufacturing plant

Sundolitt GmbH
Langer Kamp 1
38644 Goslar

This European Technical Assessment
contains

11 pages including 1 annex which form an integral part of
this assessment

This European Technical Assessment is
issued in accordance with Regulation (EU)
No 305/2011, on the basis of

EAD 040650-00-1201

This version replaces

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Specific Part

1 Technical description of the product

The extruded polystyrene foam boards are made of rigid cellular plastics material extruded from polystyrene or one of its copolymers and which has a closed cell structure. The blowing agent mixture is carbon dioxide (CO₂). The extruded polystyrene foam boards have a skin on both surfaces and a special edge treatment (shiplap).

The extruded polystyrene foam boards do not contain Hexabromocyclododecane (HBCD).

The extruded polystyrene foam boards have the following designations:

"Sundolitt XPS 300"

"Sundolitt XPS 500"

"Sundolitt XPS 700".

The extruded polystyrene foam boards are manufactured with the following dimensions:

Nominal thicknesses:	50 mm to 160 mm for "Sundolitt XPS 300"
	60 mm to 120 mm for "Sundolitt XPS 500" and "Sundolitt XPS 700"
Nominal length:	1250 mm (primarily)
Nominal widths:	600 mm

The European Technical Assessment has been issued for the product on the basis of agreed data/information, deposited with Deutsches Institut für Bautechnik, which identifies the product that has been assessed. The European Technical Assessment applies only to products corresponding to this agreed data/information.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The extruded polystyrene foam boards are intended to be used as load bearing layer and/or thermal insulation outside the waterproofing. The boards are laid uniformly on the substrate to which they are applied. In particular the following applications are intended:

- Load bearing and thermal insulation underneath foundation slabs
- External horizontal and vertical thermal insulation of in-ground constructions in non-structural applications (also in case of groundwater)
- Inverted roof insulation (including park deck and green roof applications)

The performance according to section 3 only applies if the thermal insulation boards are installed according to the manufacturer's installation instructions and if they are protected from precipitation, wetting or weathering during transport and storage before installation.

Concerning the application of the thermal insulation boards, also the respective national regulations shall be observed.

Where the thermal insulation boards are fixed by using adhesives, only such adhesives shall be used, which are suitable for this purpose. The assessment of these fixings is not subject of this European Technical Assessment.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the extruded polystyrene foam boards of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

Essential characteristic	Performance
Adhesion behaviour under compressive and shear load on large-sized samples	See Annex A
Shear strength	No performance assessed
Density test acc. to EN 1602:2013	density range:
"Sundolitt XPS 300"	
thickness $50 \text{ mm} \leq d \leq 80 \text{ mm}$	$32 \text{ kg/m}^3 - 38 \text{ kg/m}^3$
thickness $80 \text{ mm} < d \leq 120 \text{ mm}$	$30 \text{ kg/m}^3 - 35 \text{ kg/m}^3$
thickness $120 \text{ mm} < d \leq 160 \text{ mm}$	$32 \text{ kg/m}^3 - 35 \text{ kg/m}^3$
"Sundolitt XPS 500"	
thickness $60 \text{ mm} \leq d \leq 120 \text{ mm}$	$34 \text{ kg/m}^3 - 39 \text{ kg/m}^3$
"Sundolitt XPS 700"	
thickness $60 \text{ mm} \leq d \leq 120 \text{ mm}$	$39 \text{ kg/m}^3 - 44 \text{ kg/m}^3$

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire test acc. to EN ISO 11925-2:2010	Class E acc. to EN 13501-1:2007 + A1:2009

3.3 Energy economy and heat retention (BWR 6)

Essential characteristic	Performance
Thermal conductivity at mean reference temperature of 10 °C test acc. to EN 12667:2001 or EN 12939:2001 and aging procedure acc. EN 13164:2012+A1:2015, Annex C with deviating storage time period (sliced specimen) of $(90 \pm 2/-2)$ days prior to testing	
"Sundolitt XPS 300"	
thickness $50 \text{ mm} \leq d \leq 60 \text{ mm}$	$\lambda_{D(90d)} = 0.033 \text{ W/(m} \cdot \text{K)}$
thickness $60 \text{ mm} < d \leq 120 \text{ mm}$	$\lambda_{D(90d)} = 0.037 \text{ W/(m} \cdot \text{K)}$
thickness $120 \text{ mm} < d \leq 160 \text{ mm}$	$\lambda_{D(90d)} = 0.041 \text{ W/(m} \cdot \text{K)}$
"Sundolitt XPS 500"	
thickness $d = 60 \text{ mm}$	$\lambda_{D(90d)} = 0.033 \text{ W/(m} \cdot \text{K)}$
thickness $60 \text{ mm} < d \leq 80 \text{ mm}$	$\lambda_{D(90d)} = 0.035 \text{ W/(m} \cdot \text{K)}$
thickness $80 \text{ mm} < d \leq 120 \text{ mm}$	$\lambda_{D(90d)} = 0.037 \text{ W/(m} \cdot \text{K)}$
"Sundolitt XPS 700"	
thickness $d = 60 \text{ mm}$	$\lambda_{D(90d)} = 0.035 \text{ W/(m} \cdot \text{K)}$
thickness $60 \text{ mm} < d \leq 120 \text{ mm}$	$\lambda_{D(90d)} = 0.037 \text{ W/(m} \cdot \text{K)}$
Moisture conversion coefficient	No performance assessed

Essential characteristic	Performance
<p>Water absorption</p> <p>Long term water absorption by total immersion test acc. to EN 12087:2013 (method 2A) "Sundolitt XPS 300", "Sundolitt XPS 500", "Sundolitt XPS 700"</p> <p>Long term water absorption by diffusion test acc. to EN 12088:2013 "Sundolitt XPS 300", "Sundolitt XPS 500", "Sundolitt XPS 700"</p>	<p>WL(T)0,7 ($W_{it} \leq 0,7 \text{ Vol.}\%$)</p> <p>WD(V)3 ($W_{dV} \leq 3,0 \text{ Vol.}\%$)</p>
<p>Freeze-thaw resistance test acc. to EN 12091:2013</p> <p>using the wet test specimens from having done the water diffusion test in accordance with EN 12088 "Sundolitt XPS 300", "Sundolitt XPS 500", "Sundolitt XPS 700"</p> <p>Reduction in compressive stress at 10 % deformation or in compressive strength of the re-dried specimens, when tested in accordance with EN 826:2013</p>	<p>FTCD1 ($W_v \leq 1,0 \text{ Vol.}\%$) $\leq 10 \%$</p>
Water vapour diffusion resistance factor	No performance assessed
<p>Geometrical properties</p> <p>Thickness test acc. EN 823:2013 (clause 7.2, figure 2, measuring set-up 3)</p> <p>Length, width test acc. EN 822:2013</p> <p>Squareness in direction of length and width; in direction of thickness test acc. EN 824:2013</p> <p>Flatness in direction of length and width test acc. EN 825:2013</p>	<p>tolerance</p> <p>-2/+3 mm</p> <p>$\pm 8 \text{ mm}$</p> <p>5 mm/m</p> <p>2 mm</p>
<p>Deformation under specified compressive load and temperature conditions test acc. to EN 1605:2013</p> <p>"Sundolitt XPS 300", "Sundolitt XPS 500", "Sundolitt XPS 700"</p>	<p>load: 40 kPa; temperature: (70 ± 1) °C; time: (168 ± 1) h</p> <p>$\leq 5 \%$</p>

Essential characteristic	Performance
Dimensional stability under specified conditions test acc. to EN 1604:2013 "Sundolitt XPS 300", "Sundolitt XPS 500", "Sundolitt XPS 700"	temperature: 70 °C and 90 % R.H. DS(70,90) ($\Delta\varepsilon_l \leq 5\%$, $\Delta\varepsilon_b \leq 5\%$, $\Delta\varepsilon_d \leq 5\%$)
Tensile strength perpendicular to faces "Sundolitt XPS 300", "Sundolitt XPS 500", "Sundolitt XPS 700"	TR200 ($\sigma_{mt} \geq 200$ kPa)
Volume percentage of closed cells test acc. to EN ISO 4590:2016 (method 1 with correction) "Sundolitt XPS 300", "Sundolitt XPS 500", "Sundolitt XPS 700"	$\geq 95\%$

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with EAD No. 040650-00-1201, the applicable European legal acts are: 1995/467/EC and 1999/91/EC¹

The systems to be applied are:

- System 1 for Essential characteristics concerning Mechanical resistance and stability (BWR 1)
- System 3 all other Essential characteristics

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 6 September 2022 by Deutsches Institut für Bautechnik

Frank Iffländer
Head of Section

beglaubigt:
Wendler

¹ as amended

**Sundolitt XPS 300,
Sundolitt XPS 500,
Sundolitt XPS 700**

Annex A

1. Compressive stress

1.1 Slip deformation

acc. to EAD, chapter 2.2.1.2

Deformation until the conventional elastic zone (distinct straight portion of the force-displacement curve) is reached

Sundolitt XPS 300				
thickness (mm)	1x100	3x100	1x120	2x120
density (kg/m ³)	30		31	
compressive stress, σ_a	37	66	34	42
initial displacement X_a (mm)	0,29	0,79	0,24	0,58

2. Compressive creep

2.1 Compressive creep (single-layer board)

acc. to EAD, chapter 2.2.3.1

Sundolitt XPS 300	thickness 50 mm			thickness 120 mm		
density (kg/m ³)	35			33		
compressive stress/ deformation acc. EN 826 (kPa / %)	380/10			411/10		
load stage (kPa)	80	121	161	87	131	174
X_0 (mm)	0,04	0,14	0,21	0,48	0,64	0,92
X_{ct} (mm)	0,12	0,23	0,31	0,52	1,43	3,00
X_{ct50} (mm)	0,28	0,41	0,55	1,17	3,15	7,15
X_{t50} (mm)	0,32	0,55	0,76	1,65	3,79	8,07
Sundolitt XPS 300	thickness 160 mm					
density (kg/m ³)	33					
compressive stress/ deformation acc. EN 826 (kPa / %)	399/10					
load stage (kPa)	90	130	190			
X_0 (mm)	0,64	0,90	1,37			
X_{ct} (mm)	0,31	0,87	5,03			
X_{ct50} (mm)	0,81	2,22	14,72			
X_{t50} (mm)	1,45	3,12	16,09			

Sundolitt XPS 300,
Sundolitt XPS 500,
Sundolitt XPS 700

Annex A

Sundolitt XPS 500	thickness 60 mm			thickness 120 mm		
density (kg/m ³)	36			34		
compressive stress/ deformation acc. EN 826 (kPa / %)	577/10			589/10		
load stage (kPa)	115	173	231	118	177	236
X ₀ (mm)	0,20	0,37	0,54	0,51	0,67	0,93
X _{ct} (mm)	0,28	0,43	0,79	0,29	0,50	0,88
X _{ct50} (mm)	0,54	0,84	1,55	0,62	1,01	1,60
X_{t50}(mm)	0,74	1,21	2,09	1,13	1,68	2,53
Sundolitt XPS 700	thickness 60 mm			thickness 120 mm		
density (kg/m ³)	41			39		
compressive stress/ deformation acc. EN 826 (kPa / %)	815/2			806/10		
load stage (kPa)	200	265	360	171	256	341
X ₀ (mm)	0,30	0,38	0,49	0,58	0,83	1,25
X _{ct} (mm)	0,19	0,26	0,49	0,95	2,07	4,24
X _{ct50} (mm)	0,41	0,57	1,10	1,52	3,20	7,19
X_{t50}(mm)	0,71	0,95	1,59	2,10	4,03	8,44

2.2. Compressive creep (multi-layer installation)
acc. to EAD, chapter 2.2.3.1

Sundolitt XPS 300	thickness 3x100 mm		
density (kg/m ³)	30		
compressive stress/ deformation acc. EN 826 (kPa / %)	352/10		
load stage (kPa)	90	130	190
X ₀ (mm)	2,73	4,37	6,27
X _{ct} (mm)	1,99	3,97	12,33
X _{ct50} (mm)	2,58	5,95	20,78
X_{t50}(mm)	5,31	10,32	27,05
Sundolitt XPS 300	thickness 2x120 mm		
density (kg/m ³)	30		
compressive stress/ deformation acc. EN 826 (kPa / %)	416/10		
load stage (kPa)	90	130	190
X ₀ (mm)	1,48	2,30	3,41
X _{ct} (mm)	1,05	2,16	7,99
X _{ct50} (mm)	1,59	3,81	14,88
X_{t50}(mm)	3,07	6,11	18,29

Sundolitt XPS 300,
Sundolitt XPS 500,
Sundolitt XPS 700

Annex A

3. Behaviour under shear load (large-sized specimen)
acc. to EAD, chapter 2.2.4

Sundolitt XPS 300	thickness 160 mm
density (kg/m ³)	33
shear strength τ_{large} acc. EAD chapter 2.2.4 and the guidelines in EN 12090 (kPa)	133

4. Creep under shear
acc. to EAD, chapter 2.2.5

Sundolitt XPS 300	
thickness	160 mm
density (kg/m ³)	33
shear strength/ deformation acc. EAD (kPa)	133
load stage (kPa)	46,6
X _{t0} (mm)	1,49
X _{tct} (mm)	0,90
X _{tct50} (mm)	2,11
X_{t50}(mm)	3,60

5. Creep under combined compressive and shear load
acc. to EAD, chapter 2.2.6

Sundolitt XPS 300		
thickness	160 mm	
compressive stress/ deformation acc. EN 826 (kPa/ %)	399/10	
shear strength/ deformation acc. EAD (kPa)	133	
density (kg/m ³)	33	
load stage (kPa)	46,6	130
deformation under	shear load	compressive load
X _{t0} /X ₀ (mm)	1,32	1,06
X _{tct} /X _{ct} (mm)	1,87	2,89
X _{tct50} /X _{ct50} (mm)	5,11	6,91
X_{t50} /X_{t50}(mm)	6,43	7,97

Sundolitt XPS 300,
Sundolitt XPS 500,
Sundolitt XPS 700

Annex A

6. Adhesion behaviour under compressive and shear load on large-sized samples
acc. to EAD, chapter 2.2.8

Sundolitt XPS 300			
Adhesive friction coefficient between the extruded polystyrene foam boards Acc. EAD chapter 2.2.8, Annex A, A.3.1			
thickness	2x 120 mm		
density (kg/m ³)	32		
Compression stress – load stage (kPa)	15	45	90
Adhesive friction coefficient regarding the compression stress – load stage	0,49	0,55	0,55
Adhesive friction coefficient	0,53		
Adhesive friction coefficient between the extruded polystyrene foam boards and in-situ concrete as well as a concrete finished part with foil Acc. EAD chapter 2.2.8, Annex A, A.3.2			
thickness	1x 160 mm		
density (kg/m ³)	33		
Compression stress – load stage (kPa)	15	45	90
Adhesive friction coefficient regarding the compression stress – load stage	0,35	0,50	0,47
Adhesive friction coefficient	0,44		